

Chapter 3: Minuteman Missile Sites in South Dakota (1960s-80s)

In the late 1950s the Air Force chose South Dakota as one of the locations to base the nation's nuclear arsenal with the installation of Minuteman missiles. The Army Corps of Engineers (Army Corps) began surveying sites throughout western South Dakota by the fall of 1960, and subsequently began negotiating with landowners for rights-of-entry to construct Launch Facilities (LF) and Launch Control Facilities (LCF) on their property. The Minuteman I Intercontinental Ballistic Missile (ICBM) construction program at Ellsworth Air Force Base progressed rapidly. Under supervision of the Army Corps, Peter Kiewit and Sons' Inc. (Kiewit Company), the Boeing Corporation, and their subcontractors began construction of the 150 LFs and fifteen LCFs during the fall of 1961. Their work, both in construction and then in activation of the Minuteman I, furthered the nation's defense program, but also affected western South Dakota economically and socially, an influence that remained through the Minuteman's deactivation.

Site Location

The Air Force's policy on site selection in South Dakota was multifaceted. Sites were primarily selected by balancing a variety of criteria, including maximizing Minuteman operations, minimizing each sites' vulnerability to sabotage, using the taxpayers' money wisely, and adapting individual sites to construction and operational needs, all with an eye to unique qualities of individual locations.ⁱ Other factors that contributed to the selection of sites were the physical features of the land, including the geology and terrain of the area, the types of soil, and the amount of available ground water.ⁱⁱ

For cost and efficiency, the Air Force located missile sites near the existing Ellsworth Air Force Base in order to provide logistical support to the facilities. The missiles were located within an area approximately one hundred miles east and north of the base, in an expanse covering approximately 13,500 square miles of western South Dakota. The three Minuteman I ICBM squadrons at Ellsworth Air Force Base, each consisting of five LCFs and fifty LFs, were located in the vicinity of the communities of Wall, Union Center, and Belle Fourche.ⁱⁱⁱ

The Air Force positioned each missile flight (one LCF and ten LFs) in the same geographic area, but individual LFs could not be directly adjacent to another LF or the LCF. Minimally, the Air Force required LFs and LCFs to be geographically separated by an area large enough to withstand a ten-megaton explosion at an adjacent facility. Air Force specifications also required that the sites be separated so multiple facilities could not be targeted together.^{iv} The Air Force additionally attempted to select sites that would have the least adverse effect on nearby communities and private property.^v

Land Purchase

The Air Force selected LF and LCF sites based on the surveys completed by the Army Corps, Omaha District Office. Prior to construction of the missile sites in South Dakota, right-of-entry, easements, and land purchase agreements needed to be made with hundreds of property owners.

The acquisition for the 150 LFs, fifteen LCFs, and approximately 1,732 miles of Hardened Intersite Cable System (HICS) connecting the facilities included three phases. The first phase was securing right-of-entry for survey and exploration of proposed sites. Next, the Air Force worked with landowners to obtain right-of-entry for facility construction. The final phase included negotiations for land purchase or permanent easements and compensation for damages during the construction of the facilities.^{vi}

Phase one began in the fall of 1960. The right-of-entry Air Force representatives inspected potential sites throughout western South Dakota to assess the soil, geology, terrain, and ground water for suitability for site construction.^{vii} By early 1961 the locations for the LFs and LCFs were identified and HICS routes mapped. Following site selection, the Army Corps solicited landowner's signatures for right-of-entry to commence construction of the LFs and LCFs on their property. For the construction of each LCF or LF the Air Force required temporary construction easements of between four to six acres for construction equipment and dirt removed from the silos.^{viii} Following the right-of-entry for construction, the Army Corps negotiated with landowners to purchase the land. In land purchase and easement negotiations, the government was required to provide just compensation, defined as fair market value.^{ix}

In addition to land purchase, the government obtained permanent easements at the LF and LCF sites. It needed these easements in order to restrict land use in the area surrounding each LF and LCF to certain types of construction and agricultural activities.^x The government also obtained permanent easements for the access road at both the LF and LCF and for the azimuth markers at each LF site, which were located outside of the fence and used to site the missile. Following construction the land was inspected by a real estate representative of the Army Corps and through negotiation an agreement was made with the owner for a cash settlement of any damages.^{xi}

Army Corps representatives negotiated with several hundred more property owners for easements for the underground HICS connecting the LFs and LCFs. These cables, installed four to eight feet below ground and used to transmit data between missile sites, required a temporary construction easement of thirty-five feet in width for approximately 1,732 miles between all 165 sites. After construction was complete, the government obtained a permanent easement for a path sixteen and one-half feet wide.^{xii} Following installation of the HICS, landowners could return to using the land above the cable for normal ranching or agricultural activities.

Such large-scale construction was not without its inconveniences, and to address some of the issues pertaining to land acquisition during this initial period, the Army Corps real estate field office distributed a pamphlet to property owners in western South Dakota titled "Facts About Minuteman Land Acquisition." The pamphlet promised landowners that the government would negotiate for the purchase of property and address any damages and losses. The pamphlet reminded the property owners that the Constitution permits the taking of private property for public use as long as the landowner was paid "just compensation."^{xiii} Even with the issue of national security at stake, policymakers had no desire simply to confiscate land. If the

landowners and the government could not agree on compensation, however, the government had the right to acquire the land through condemnation. A declaration of taking was filed and compensation was deposited with the court for the property owner. Negotiations continued and if an agreement could not be made the condemnation case would be brought to trial.

Minuteman Missile Area Landowners Association

While construction crews built some of the Minuteman sites in South Dakota on land already owned by the government, such as LF Delta-09, contractors constructed most of the sites on private property. During the site-selection process, some landowners did not feel that the Army Corps provided enough information to sign rights-of-entry to their property. To ensure that the government took landowners' rights into consideration during site selection and fairly compensated landowners, a group of farmers and ranchers formed the Minuteman Missile Area Landowners Association (MALA) in the early 1960s.

MALA disseminated information to area landowners, believing that working collectively would aid the defense effort while safeguarding their private interests.

Members paid a minimal fee of one dollar to participate in the organization, primarily to cover the cost of postage and mailings. The MALA's first president was Eugene Pellegrin of Enning, South Dakota, and the first vice president was Cecil Hayes of Elm Springs, South Dakota. Eight additional members, including Burle Dartt, Ray Naescher, Ben Paulsen, Tony Oergerli, Robert Simpfendoerfer, Delbert Paulsen, Ferdinand Schroeder, and Leonel Jensen, served as directors to assist in collecting and distributing information.^{xiv} In addition to nearly 150 MALA members supporting their cause, United States Senator Francis H. Case also attempted to assist negotiations between the landowners and the Air Force and Army Corps. Although Case was a longtime proponent of strong national defense and a supporter of the Minuteman I missile program at Ellsworth Air Force Base, he often corresponded with the landowner organization and the Army Corps concerning the project and advocated for fair and timely compensation.^{xv}

Most landowners understood that the national defense program required the installation of Minuteman missiles, and the technical reasons why the Air Force required use of their land. Prior to signing any agreements, however, MALA members wanted the government to address the disadvantages of having a LF or LCF constructed within their property. Many landowners were concerned that the location of the proposed sites would disrupt irrigation systems, take irreplaceable land, or interfere with agricultural operations. While their primary stated goal was to obtain a reasonable settlement for land and construction damages, the group also wanted to minimize the effects of the missile system upon nearby schools, roads, and the local police force.^{xvi}

Prior to signing rights-of-entry needed for construction, the MALA voiced their concerns with Air Force and Army Corps personnel at several meetings in Rapid City in 1960 and 1961. MALA members questioned how the Air Force selected locations for the LFs and LCFs. Individual MALA members desired to know if selected sites could be moved to sections of their property less desirable for agricultural

purposes.^{xvii} In early April 1961, an Army Corps real estate representative explained that the missiles were part of an interrelated system and the location could not be altered aside from minor changes.^{xviii} One property owner offered to donate the land if the Air Force would move the proposed LF to a corner of the wheat field instead of in the middle. His offer was rejected, and, in this case, the Air Force did not alter the proposed site for this facility.^{xix}

MALA members also pressed the Air Force at these meetings for further information about compensation for their land and losses. Many wanted to know what assessment they should expect for their property, and if they would receive compensation for damages incurred during construction or from decreases in land value due to the presence of the missiles in the area.^{xx} Army Corps officials responded that landowners were entitled to fair compensation for their losses and that the dollar value would be reached through negotiation between the government agency and individual property owners. Compensation for damages would be negotiated in much the same way.^{xxi} Although many landowners received compensation for their land and losses, some felt the settlement offered was inadequate.^{xxii}

After months of meetings and negotiations, seventy-five percent of the property owners of proposed missile sites signed rights-of-entry agreements by July of 1961. At the same time, approximately ninety percent of landowners involved with the underground cables had also signed agreements.^{xxiii} MALA president Pellegrin stated in a newspaper article that many of the property owners who refused to sign the agreement were negotiating for damages unique to their property.^{xxiv} In some cases, property owners never signed the rights-of-entry agreement needed to begin construction and in these cases, the Army Corps filed declarations of taking and deposited money with the court for the property owner. The Army Corps based the compensation on the government's original estimate of fair market value for the property.
^{xxv}

Despite efforts of the MALA to protect their rights and obtain compensation for their losses, some members of the public and government criticized the organization's members. They condemned landowners for slowing the defense effort, termed them unpatriotic, and accused them of holding up new business created by the influx of construction workers and additional Air Force officers.^{xxvi} The Air Force and Army Corps often reminded members of the MALA and other residents of western South Dakota of the importance of the Minuteman I ICBM program to the security of the United States. For example, the land acquisition pamphlet distributed to property owners stated, "like its prototype, the Minuteman of 1774, this immensely-important project for our national defense is authorized by the Congress of the United States."^{xxvii} Criticism aside, however, not every delay in Minuteman construction could be pinned on reluctant landowners. As late as March 1961, Congress had not yet fully appropriated the funding for the Minuteman I ICBM missile program at Ellsworth Air Force Base. Therefore, property owners did not stall construction of the sites in South Dakota or the nation's defense effort.^{xxviii} In reality, the land acquisition and construction of the Minuteman I missile facilities in South Dakota was an accelerated program that exceeded many expectations. Approximately one year after Army Corps representatives started testing soil and mapping missile facilities contractors began

construction. After the construction of the LFs and LCFs in western South Dakota the MALA disbanded. The organization remained inactive until the early 1990s when the Air Force began the deactivation process of the Minuteman II ICBMs and a new generation of property owners worked together to disseminate information and provide support.

Site Construction

In 1960 the U.S. Army established the Corps of Engineers Ballistic Missile Construction Office (CEBMCO) as an independent organization to supervise missile site construction across the country, including Ellsworth Air Force Base. With the new agency, the construction of ICBM facilities fell under uniform and centralized control.^{xxix} The commanding officer of CEBMCO appointed weapon system directors to manage the construction of Minuteman facilities at Ellsworth Air Force Base, as well as other ICBM construction sites. These directors worked at area offices, such as the one at Ellsworth Air Force Base, to directly supervise the construction of numerous contractors for the multiple phases of the construction process.^{xxx}

CEBMCO originated with a staff of twenty-seven to supervise the construction of the missile facilities throughout the United States. That number grew to three thousand employees working in seventeen states by the mid-1960s. In South Dakota, CEBMCO appointed Colonel Sidney T. Martin to direct the construction project, while Lieutenant Colonel George V. Svoboda was named deputy engineer, Lieutenant Colonel James M. Gale assistant engineer, and Warren Withee served as the Chief of the Construction Branch.^{xxxi} At the time, constructing missile facilities was one of the largest construction projects undertaken by the Army Corps. In the 1960s CEBMCO and its predecessor agencies supervised the construction of 1,200 missile facility sites nationwide, including the 165 sites in South Dakota.^{xxxii}

Although CEBMCO staff at Ellsworth did not physically design or construct the LFs or LCFs, they were responsible for soliciting bids, selecting contractors, and reviewing plans. After supervising contractors during construction, CEBMCO aided the Air Force site activation task force in fitting the silos with operational missiles.^{xxxiii}

In the summer of 1961 the Home Office Special Projects District at Kiewit Company in Omaha, Nebraska, won the bid to construct the Minuteman I ICBM silos for Ellsworth Air Force Base in South Dakota. The Kiewit Company bid estimate of \$56,220,274 was nearly \$10 million less than government projections.^{xxxiv}

Using the designs developed by Parsons-Staven, a Los Angeles architectural-engineering firm, Kiewit Company was the primary contractor for the Minuteman I ICBM facilities in South Dakota.^{xxxv} The contract included preparing sites for facility construction and installing facilities using prefabricated parts. They were also responsible for negotiating with landowners over damages caused by the storage of excess dirt excavated from the silo shaft.

Groundbreaking ceremonies for the construction of the Minuteman I ICBM silos in South Dakota took place on 11 September 1961 in front of a

crowd of approximately two hundred on-lookers at a site later known as Lima-06, located just north of Sturgis. Instead of the traditional shoveling of dirt to symbolize the start of construction, a small explosion signified the power of this immense undertaking. The ceremony theme was "Partners for Peace."^{xxxvi}

To make for a more efficient construction process, contractors assigned crews specific tasks, which they then performed at numerous sites. Crews assigned to the Minuteman construction project in South Dakota varied in size from four to thirty, depending on the complexity of their task.^{xxxvii} The first step in constructing the LFs was the excavation and grading at each site. The construction crew assigned this task used a bulldozer and clam shovel to create a circular cut that they then excavated to a depth of approximately thirty-five feet. After this task, the crew moved on to another site to complete the same task until all 150 LFs were excavated. A second crew moved in and proceeded to dig the shaft for the silo using a large auger. The shaft was a circular hole with a diameter approximately fifteen to eighteen feet and extended over eighty feet below the ground. The next task involved a third crew that poured a concrete deflector plate into the bottom of the shaft. After this crew secured the bottom of the hole, steel contractors lowered a twenty-five-ton, sixty-two-foot prefabricated steel liner into position. The liner, which formed the skeleton of the silo, included a quarter-inch steel plate and rings of reinforced bars. Contractors then poured concrete around the exterior of the steel liner, forming a twelve-inch-thick wall. Additional crews constructed a lower equipment room around the silo and a support building adjacent to the silo, both of reinforced concrete and below ground level. Once this stage was complete, crews backfilled the sites with dirt originally excavated for the silo and facility.^{xxxviii}

Kiewit Company subcontracted much of the work to other firms. For example, Summit Construction Company was responsible for the initial site grading, excavating to the approximate thirty-five-foot level, and storing dirt from those tasks. The Gustav Hirsch Organization installed electrical conduit and backfilled the area around the conduit. Natkin and Company installed mechanical pipes and was responsible for the backfill and compaction around them. For the installation of the HICS, Kiewit Company retained American Bridge Design-United States Steel Corporation.^{xxxix}

The construction procedure involved moving nearly twenty million cubic yards of dirt for the 150 LFs and fifteen LCFs. In addition, contractors poured nearly one hundred fifty thousand cubic yards of concrete and used thirty-five thousand tons of steel to reinforce the underground facilities.^{xl} Although the numbers appear large, constructing Minuteman I ICBM LFs was much less challenging than the construction of earlier Atlas and Titan LFs. Minuteman I LFs were smaller than earlier ICBM facilities and they used prefabricated parts and standardized construction techniques. Furthermore, the Minuteman I LFs did not require the elevator that positioned the missile for launch or the complex loading system that burdened earlier missiles.^{xli}

Despite steps taken to minimize costs and speed deployment, Minuteman construction did not always proceed smoothly. In some instances, work stoppages, weather, and injuries delayed construction of the 165 Minuteman LFs and LCFs in South Dakota. The famously unpredictable

plains weather affected the construction of the sites with dust storms, heavy rains, snow, and even severe cold temperatures. Moreover, work at the missile sites in South Dakota stopped on several occasions due to labor difficulties. For example, on 6 June 1962 the American Bridge Company millwright workers went on strike for two days to protest the Kiewit Company's assignment of the setting anchor bolt task to ironworkers, which they believed to be their task. One week later Gustav Hirsch electricians protested the Kiewit Company's requirement that they report for work directly to LFs instead of a central point.^{xlii} Contractors and workers dealt with such problems using "policies, procedures, and methods of adjustment" developed by the Missile Sites Labor Commission, the eleven-person agency appointed by President Kennedy in 1961 to aid in resolving labor disputes at missile and space sites quickly, and therefore without delay to the national defense program.^{xliii}

Worker safety was an important issue at the missile construction sites and the Kiewit Company required employees to wear hard hats. During the two-year intensive construction period employing thousands of workers, sixty-two injuries and two fatalities were reported at the missile facilities in South Dakota.^{xliv} In comparison, Minot Air Force Base in North Dakota experienced thirty-six construction-related injuries and two deaths, while Malmstrom Air Force Base suffered twelve injuries and one fatality.^{xlv} Clearly this was dangerous work, as with all heavy construction, though the Kiewit Company received the National Safety Council's Award of Honor in 1962 for its missile construction efforts. During the second half of that year, the company logged over eight hundred thousand accident-free work hours, offering a safety record due in part to regulations set forth by the Army Corps. For example, the Army Corps required that any excavations at the sites had to have a slope on its bank so it would not cave in on anyone working inside the hole or shaft.^{xlvi}

Despite delays and unfortunate incidents, construction in South Dakota was completed by the fall of 1963, in less than two years. Construction of Delta-01 had been completed the previous year on 29 November 1962 at an estimated cost of just over \$800,000 and construction of Delta-09 was completed on 26 November 1962 at an estimated cost of \$354,500. The final costs for the construction of the Minuteman missiles in South Dakota may have been as high as \$75.7 million.^{xlvii}

Missile installation

While Kiewit Company and other contractors worked to construct missile facilities throughout western South Dakota, the Boeing Company assembled the actual missiles, and developed much of the ground-support equipment, such as the launch control system, and the security system. More importantly, Boeing ensured that the missiles worked through testing, installed the missiles beginning in February 1963, and maintained them before transfer to the Air Force in the summer and fall of 1963.^{xlviii} Delta-01 and Delta-09 were turned over to SAC on 30 June 1963, making them among the first Minuteman sites to be activated at Ellsworth.

The emplacement of the missile in the silo employed skilled crews using a Transporter Erector (TE). After operators backed the TE into place, the missile container was raised to a vertical position over the silo

opening. The missile was then freed from its restraining harnesses and a large hoist lowered it into the launcher. Once the missile was in the silo, technicians attached the reentry vehicle on top of the guidance and control system. After installing the reentry vehicle, the missile was aligned and oriented to the North Star and a targeting team set the arming and fusing system.^{xlix} After Boeing finished installing all 150 missiles, the Air Force Systems turned the LFs and LCFs into operational facilities and SAC declared all three Strategic Missile Squadrons (SMS) combat ready on 1 November 1963.

Site Activation

The 44th Strategic Missile Wing (SMW) at Ellsworth Air Force Base was activated on 1 January 1962. Air Force personnel assigned to the 44th Missile Wing began training even while construction and development of missiles for the South Dakota Minuteman program was underway. Ellsworth Air Force Base received its first Minuteman I in February 1963.¹ The Air Force placed the first total flight of Minuteman I ICBMs at Ellsworth Air Force Base on alert status in July 1963 when Base commander, Colonel Kenneth W. Northamer, handed over the keys for the flight to Colonel Virgil M. Cloyd, commander of the 44th SMW.^{li} By November 1963, the 66th, 67th, and 68th SMS of the 44th SMW were ready for combat.^{lii} Each squadron was responsible for five flights of ten missiles, totaling 150 Minuteman I missiles.

Economic and Social Impacts on the Region

Economic Boost to the Region

Like earlier ICBM programs, the Minuteman program had many lasting effects on western South Dakota. The immediate and lasting impacts of the Minuteman missile program on South Dakota and its people are clearly a part of the missile story and were described by former missileer, Craig Manson,

"It is a world historical event as well, ... the communities, the people who lived in those communities-they are all part of the story, too. Wall Drug, where many, many, many missile crews had breakfast and lunch, that's kind of part of the story. The Diamond Café in Newell, South Dakota, I don't know if it is even still there, but that is part of the story because it would not have been there long if it hadn't been for the missile crews, you know; Bear Butte in western South Dakota, Spearfish and Belle Fourche and towns like Philip and White Owl in the north central part of the state, and all of these communities are part of the story, too, and the way the people in these communities felt, whether they liked it or whether they didn't like it, however they felt about living in the shadow of those missiles."^{liii}

The large influx of construction workers in the early 1960s and the presence of additional Air Force personnel over the following thirty years affected local communities both economically and socially. Construction of the Ellsworth Air Force Base Titan facilities outside of Sturgis, New Underwood, and Hermosa beginning in late 1959 boosted the local economy and real estate market by providing jobs and demands for housing and goods and services.^{liv} This trend continued with the

construction of the Minuteman I facilities in western South Dakota. Rapid City and smaller communities near the bases and missile sites benefited economically. Examples of increased economic activity brought by the expansion of the staff at Ellsworth Air Force Base are described in the following paragraphs.

The Kiewit Company alone employed nearly three thousand workers at the missile construction sites.^{lv} The Army Corps and Boeing Company also employed large numbers of staff in South Dakota during the early 1960s. While some of the employees were transient and moved to South Dakota to work on the project, many area residents found work on the construction, therefore stimulating the local economy.^{lvi}

The employment opportunities offered to local residents during the construction of the sites was a significant impact on the local economy. When local resident Gene S. Williams was asked about how the public felt about the missiles being placed in South Dakota, he stated: "Well when they first were being constructed, you know, I think there were a lot of people that looked at them as jobs. It was very good to the local economy. There were high paying jobs, there were a lot of people that had an opportunity to work on the missile sites that, you know, that was probably as good a paying job as you could have gotten anywhere at the time. There were people that picked up skills associated with working on them that have used them the rest of their life."^{lvii} In another case, Thomas Wilson, a Kiewit Company worker who had relocated to South Dakota, was asked about his feelings constructing missile sites, he simply stated, "I figured I had a job."^{lviii}

By some estimates, the influx of new South Dakota residents, most of them union members, helped decide one of the state's closest elections, George McGovern's 1962 Senate victory. As activist Jay Davis recalled: "they were outsiders, they weren't from here, they didn't stay here long but they voted in that election....so George McGovern the great spokesman for peace may have owed his very election, as close as it was, to the workers who were building the missile silos to further the nuclear arms race."^{lix}

The missile sites themselves brought increased staff to Ellsworth Air Force Base to operate and support the facilities, while the crews and their families became a permanent part of the area's economy and social fabric until the program's deactivation a generation later. "It brought more people into the area," Wall Drug owner Ted Hustead recalled. "There have been a lot of men that were stationed at Ellsworth Air Force Base during the '60s and even today, that found their bride in western South Dakota."^{lx}

Employment in the area increased not only from direct employment for missile construction, but through the industries that supported the influx of workers. Housing surrounding Ellsworth Air Force Base was needed to accommodate the temporary workers, for example, and Boeing planned three trailer parks in 1961 to accommodate 120 units each.^{lxi} Housing construction and an increase in demand for basic day-to-day needs, such as food and clothing, was an economic boom for the area.

Many local businesses, such as Wall Drug, benefited from the increased population during the Minuteman construction phase. Although the business did not permanently expand due to the presence of construction

crews, the workers did have an impact on the business in the early 1960s. During this time Wall Drug would open its doors at 4:30 in the morning to prepare breakfast for the construction crews and pack box lunches.^{lxii} Wall Drug also experienced business from missileers and other Air Force personnel during the years Minuteman I and II ICBMs were on alert status in South Dakota. Many times, LCF personnel would stop at Wall Drug to pick up food for barbeques or personal essentials needed for their three-day alert tour that they may have forgotten on base.^{lxiii} With the introduction of new Air Force personnel regularly traveling through the area, Wall Drug began advertising free coffee and donuts for Minuteman missile crews. This eventually led to free coffee and donuts to all veterans, truck drivers, hunters, snowmobilers, and honeymooners.^{lxiv}

The local economy continued to benefit from the presence of the Minuteman at Ellsworth Air Force Base into the later part of the twentieth century. During the Force Modernization Program begun in 1971, the Air Force upgraded the Minuteman I missiles of the 44th SMW with Minuteman II missiles. The project continued until March 1973 and employed over three hundred local residents. Local businesses benefited from the sale of supplies for the project.^{lxv} Rapid City, as a regional center in the state, can be attributed in part to the number of people that were stationed at Ellsworth Air Force Base over the years to work at the base and the missile sites.

Public Improvements

In addition to the economic boost, public utilities were also improved during the Minuteman I construction phase. In the spring of 1961 the Air Force initiated an accelerated program to improve 327 miles of roads. Contractors needed improved roads throughout rural, western South Dakota to move heavy equipment to the missile sites, and the U.S. Bureau of Public Roads, Defense Fund provided funds that Congress allocated for road improvements.^{lxvi} Many of the improved roads to the missile sites were paved, which was a significant improvement over the area's typically unpaved rural roads. During the missile site construction in South Dakota the federal government designated specific routes for construction crews to follow to the sites. The government contracted with the involved county to conduct road repairs for damage from trucks hauling equipment or materials. In some cases, however, contractors did not follow designated routes, and their crews and equipment inadvertently damaged additional roads. Pennington County billed the government some \$150,000 in 1962, to cite one example, to offset the cost of road damage on undesignated routes caused by missile construction.^{lxvii} Over the years of Minuteman I and II activation in South Dakota, the road networks continued to be maintained through federal, state and local funds to accommodate Air Force personnel and maintenance activities of the sites.

Many schools also felt a direct impact from the Minuteman construction phase in the early 1960s. The Rapid City schools grew by about one thousand additional students from the nearby Titan project. *The Rapid City Journal* in January 1961 reported that it was anticipated that a similar number of students would also enroll in the Rapid City schools as a result of the Minuteman site construction.^{lxviii} It is unknown how much enrollment increased as a result of the influx of Minuteman workers' children during the two years of construction.

Race Relations

The influx of workers during the construction of the missile sites and Ellsworth Air Force Base personnel over the years included people of various ethnic backgrounds, including African Americans. Racial inequality and discrimination, both on and off base, were not isolated to Ellsworth Air Force Base and the Rapid City area, but rather are likely a window into the racial tension and discrimination being experienced by the rest of the country. Rapid City and the region around the base were not very racially diverse, and as a result, African American base personnel pointed out the lack of social centers and ethnic opportunities off base.

Alan Gropman's book, *The Air Force Integrates, 1945-1964*, reports that African American airmen at Ellsworth Air Force Base "were rejected by the local communities, and base officials seemed to be indifferent to their plight. Many business establishments were closed to blacks, all taverns were segregated, and housing for blacks was extremely limited, substandard, and exceptionally expensive."^{lxxix} Initially, some members of the Air Force opposed becoming involved in integration issues within the communities outside of the bases, feeling this was outside of their realm of control. The passing of the 1964 Civil Rights Act opened public accommodations to African Americans and allowed the Air Force to take more initiative in integration measures within the communities outside its bases.^{lxx} Following the passage of the Civil Rights Act, some racial tensions continued to some extent both on and off base for air men of different cultural backgrounds.

Oral interviews with past personnel of Ellsworth Air Force Base during the late 1960s through the early 1990s offered varying opinions on the degree of racial tension between African American and minority Air Force personnel and the surrounding community. Ken Bush, an African American stationed at Ellsworth Air Force Base during the mid-1970s and 1980s, stated that "I can honestly say that I was never mistreated anywhere I went." However, he did recall an isolated incident from the 1980s where he and another African American were refused service at an establishment in Rapid City. The matter was taken to the Rapid City Council and the two did not pursue further action.^{lxxi} Lieutenant Colonel Robert Wilson stationed at Ellsworth stated that race relations were not a problem on base, but that there were significant problems outside the base community and was surprised how African Americans and Native Americans were treated.^{lxxii}

In the Rapid City area there has historically been racial tension between the descendants of Euro-American and Native Americans, but based on the oral interviews collected to date, there is no evidence of significant tensions between the military community at Ellsworth Air Force Base and the surrounding Native American residents, at least in terms of affecting base operations.

Living Next to the Missiles

As is often the case, the presence of a large military base has a significant impact on the region. Ellsworth has become an important fixture in the community. In these ways the Minuteman program left a lasting social and economic imprint on western South Dakota, and not only in ways typically measured by statistics and numbers. An amateur baseball team in Sturgis has adopted the name Titans, referencing the Titan missiles that were once deployed a few miles east of Sturgis. In

another example, several streets in Rapid City now bear names reflecting the history and heritage of the base, including Minuteman Drive and Atlas Street.

Initially the missiles brought jobs and money to the area, but as time went on the residents had to learn to deal with nuclear weapons in their backyards. Local rancher Gene S. Williams recalled that a lot of the people that had missile sites put on their land were from an era that had traveled by horse and buggy or could recall this time, "and now you're putting a hole in the ground for a missile that could launch and go, you know, fifteen thousand miles and blow up millions of people. I mean, these types of things I think were hard for people to even put their arms around." ^{lxxiii}

For the children growing up amongst the missiles and Ellsworth Air Force Base in South Dakota, the Cold War was a part of every day life and evokes vivid memories. Tim Pavek, an environmental engineer at Ellsworth Air Force Base, recalls from his childhood hearing the B-52s. "...I remember when I was a, a little boy in bed here on a hot summer night with the windows open and I'd hear the distant rumble of the B-52s here at Ellsworth taking off. And, and, almost lay in bed shaking wondering if that was a practice mission and they'd come back or if this was the real thing and within a few minutes we'd see the fireballs of, you know, nuclear weapons over western South Dakota. So, having lived next to this Air Force base, you know, we knew that we were a big red-and-white bull's eye on the Soviet map, or that was my perception at the time." ^{lxxiv}

Tim Pavek recalled another childhood memory of the Cold War told to him by a gentleman who grew up in South Dakota, "... he says 'I remember sitting down at the kitchen table with my parents and having a very frank discussion over what we should do with regard to this, the threat of nuclear war. Um, whether we should build a bomb shelter-the people down the street were building a bomb shelter. How we should prepare ourselves for this eventuality.'" ^{lxxv}

The missiles also perhaps left emotional scars. "And here you're sitting with a thermonuclear device, that is a half mile from your house," local rancher Gene S. Williams commented, "and you know well somebody punches the wrong signal code in or turns the wrong key and you're just vapor. You don't want to dwell on that too much but you also recognize that it wasn't just the enemy that was going to blow you up, you could blow yourselves up." ^{lxxvi} Paradoxically, the missiles themselves, and their LFs and LCFs, were less physically imposing on the state's landscape.

The Cold War Continues

The domestic and local impact of the Minuteman program in economic, political, and even psychological terms, all occurred in the context of sweeping movements within the international system. Whereas the program had begun in an era when only the two superpowers possessed nuclear weapons, by the close of the 1960s at least three nations (Britain, France, and the People's Republic of China) publicly possessed this ultimate power. Other countries, Israel and South Africa (clandestinely), and Pakistan and India (publicly) would join

the nuclear club within a generation, while at the time of this writing, North Korea appears on the brink of doing the same. What once was the domain of only superpowers clearly has grown in scope. Minuteman was designed largely for a total global nuclear war, as a deterrent of awful destruction useful for warding off the complete devastation of a large-scale nuclear exchange. Whether such a system would and could help control this new era's increased risk of limited nuclear exchanges remains to be seen.

The superpowers responded to growth of the nuclear club with alarm, and with a surprising amount of cooperation. Each led collective military organizations by the mid-1950s, the North Atlantic Treaty Organization (NATO) and the Warsaw Pact in Europe most famously. Each also believed their own nuclear sword sufficient for defending theirs and their allies' interests. American policymakers thus hesitantly approved of Britain's development of an independent nuclear capability in the 1950s, believing their objection would do little to halt Britain's nuclear program in any event, and loudly criticized France's nuclear program (and subsequent withdrawal from NATO) the following decade. For each of these new nuclear nations, possession of the ultimate weapon symbolized power in a changing world: the power not only to hold its own against lesser foes, but also the power to stand up to Washington or Moscow. "We must rely on the power of the nuclear deterrent," British Prime Minister Harold Macmillan declared, "or we must throw up the sponge!" Moscow proved more adept at halting nuclear development among its allies (who largely lacked the technological and financial resources to develop such expensive weaponry in any event), save for China, which joined the nuclear club only after its break with the Kremlin in the early 1960s. During their 1961 Summit in Vienna, Kennedy and Soviet leader Nikita Khrushchev even obliquely discussed launching a joint air strike against China's embryonic nuclear program, as both leaders considered an Asian nuclear bomb a threat to their individual and collective interests. Realizing such a move would lead to war, they pursued other paths. ^{lxxvii}

By the 1970s, therefore, the bipolarity of the international system seen in the first Cold War years had given way to a world of multiple points of power. Moscow and Washington remained the two largest powers-and possessed the two largest nuclear arsenals by far-but they were no longer wholly dominant. They retained the power to impose their will on others (as in 1954 in Guatemala or in Hungary in 1956 for the United States, to name only two cases), though as the Soviets would learn in 1968 in Czechoslovakia, and the Americans in Vietnam throughout the 1960s, the use of force often carried negative consequence that far outweighed the potential gains of proving hegemony. In recognition of these changes, and of their profound implications for Asian security in particular, President Richard Nixon slowly developed the practice of what his Secretary of State Henry Kissinger termed "triangular" diplomacy. By warming American relations with China, including development of formal diplomatic and trade ties, Nixon hoped to gain leverage in Europe over the Soviets, forcing them to the negotiating table and towards the lessening of East-West tensions known as détente. The ongoing quagmire of the Vietnam War and domestic crises such as Watergate ultimately limited Nixon's diplomatic options, but the point of his effort remained: that the second half of the Cold War was far different than the first. There were more nuclear powers, and they possessed even greater stocks of nuclear weapons than before. ^{lxxviii}

Some argued the world was a safer place because of these developments. Others saw the breakdown of Soviet-American relations by the close of the Presidency of James Carter as foreboding and a new and more dangerous phase of the Cold War. The Soviet invasion of Afghanistan in 1979, prompted in part by fear of the new Islamist government in neighboring Iran that drew its power at least in part by anti-Americanism, sparked a new crisis in superpower relations. Washington condemned Moscow's move, which if successful would have given the Kremlin new influence in a region pivotal to the world's oil trade, and American leaders spent heavily to arm Afghan resistance forces in their battle against the Red Army. Ironically, these same forces spawned anti-American Islamist movements such as the Taliban and Al Qaeda, groups that each began as Mujahadiin fighters, armed by the United States for their battle against Communism.^{lxxix}

Carter's final year in office saw renewal of Cold War tensions. Contemporary critics such as Ronald Reagan, who won the White House in 1980, and later conservative historians and pundits eager to give Reagan credit for "winning" the Cold War, harshly rebuked what they perceived to be Carter's tepid opposition of and even tacit acceptance of Communism. Such biased interpretations are largely incorrect. Carter accelerated America's military build-up, and withdrew the Strategic Arms Limitation Talks II (SALT II) from the Senate (where it lacked the votes to pass in any event). He embargoed American wheat and technology exports to the Soviet Union, and even withdrew American participation from the 1980 Olympic Games in Moscow. Like President Truman thirty years before, Carter announced his own "Doctrine," vowing American intervention-most likely nuclear-against any Soviet threat to the vital Persian Gulf. The Cold War was on once more.^{lxxx}

President Reagan continued these policies of military strength and tough diplomacy against the Soviets. His rhetoric, and his long-standing visceral opposition to Communism more broadly, helped change the tone of the Cold War. Carter promised opposition to further Communist expansion. Reagan wanted to see Communism's collapse. He called the Soviet Union an "evil empire," and later declared that "Marxism-Leninism" was destined for "the ashheap of history." He refused, in 1981 at least, to meet Soviet requests for arms reductions. By the mid-1980s, the Soviet economy could no longer support the country's competition with the West. When Reagan announced plans for an expensive new space-based missile defense system termed "Star Wars," or officially the Strategic Defense Initiative (SDI), Soviet leaders knew they could not afford to keep pace. Most analysts believed SDI to be technically infeasible. The very fact that Washington seemed willing to spend the money to find out, coupled with their inability to do the same, pushed the realization among Soviet leaders of the necessity of change. They had by 1985 only fifty thousand computers in their entire country, compared to America's thirty million, and youthful reformers such as the energetic Mikhail Gorbachev began a series of radical changes of the Soviet system, with *glasnost* (openness to the West) and *perestroika* (economic reconstruction). Reagan wanted more. "Mr. Gorbachev," he declared in Berlin while overlooking the most visible symbol of the East-West divide, "tear down this wall." Gorbachev could not, at least not without prompting a right-wing revolt at home. The forces he set in play, however, those of change and of modernity, swept through Europe. In November of 1989,

Berliners both East and West tore down the wall that had divided them for more than a generation.^{lxxxix}

The Cold War was not officially over-it had never officially begun-but it was clearly at an end. It would be up to democratic reformers such as Russian President Boris Yeltsin (Gorbachev was a reformer, but he was no democrat) to move the remnants of the Soviet Empire into a new day of cooperation with its neighbors and the world. Political scientist Francis Fukuyama famously declared the progress of history to be finally at an end. With the close of the Cold War, "political liberalism" had finally won out over totalitarianism. The stability of democracies would thereafter reign. As events have sadly shown, the post-Cold War world did not bring the stability promised, leading some pundits to publicly long for the security the bipolar Cold War system offered. The threat of global thermonuclear war might have lessened after 1991, the very threat Minuteman was originally developed to counter and deter. But the world may be no less safe for it. To the question of who "won" the Cold War, while most evidence points to the West, as responsible historians we can only answer as Chinese Prime Minister Zhou Enlai did when asked the significance of the French Revolution: "it is too soon to tell."^{lxxxix}

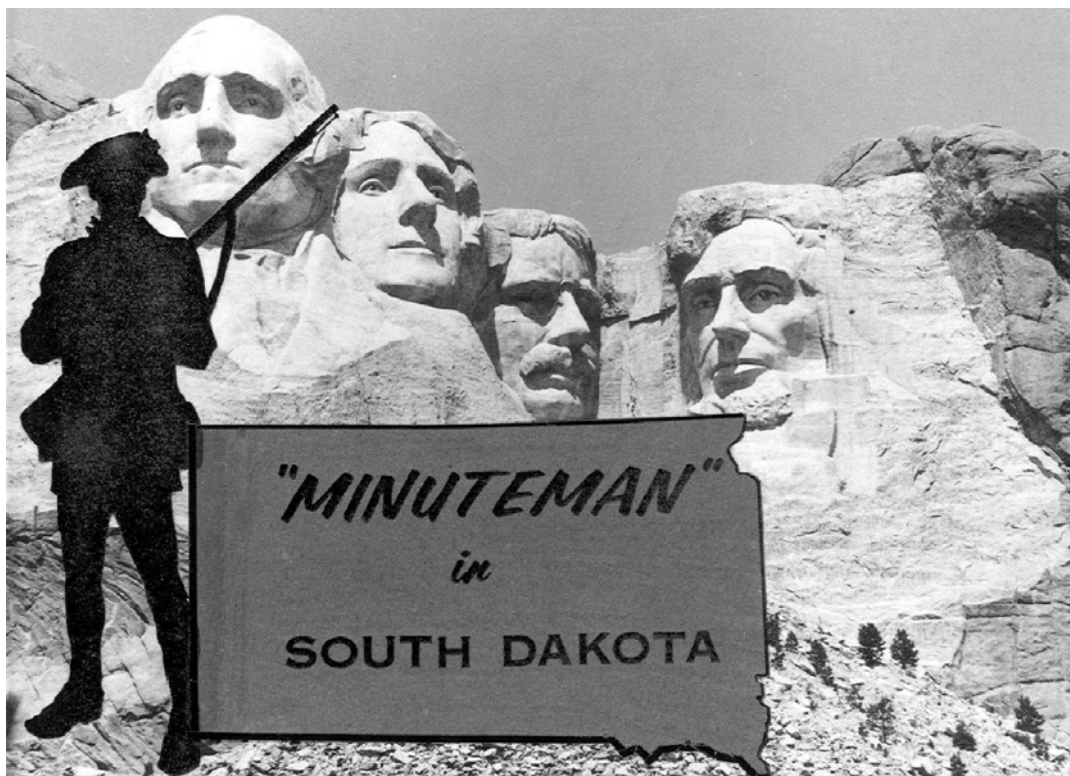


Plate 26. Minuteman comes to South Dakota ("Site Activation Chronology, Minuteman Project, Ellsworth Air Force Base, South Dakota, July 1963-October 1963," K243.012-40, in USAF Collection, AFHRA)



Plate 27. Groundbreaking ceremony at Lima-06 in South Dakota, 11 September 1961. Standing from left to right are: Major General Homer Jensen, Colonel Kenneth Northamer, South Dakota Governor Archie Gubbard, and Major General Delmar Wilson (*"Site Activation Chronology, Minuteman Project, Ellsworth Air Force Base, South Dakota, July 1963-October 1963," K243.0121-6, in USAF Collection, AFHRA*)



Plate 28. Aerial view of Delta-01 during construction (*Courtesy of National Park Service*)

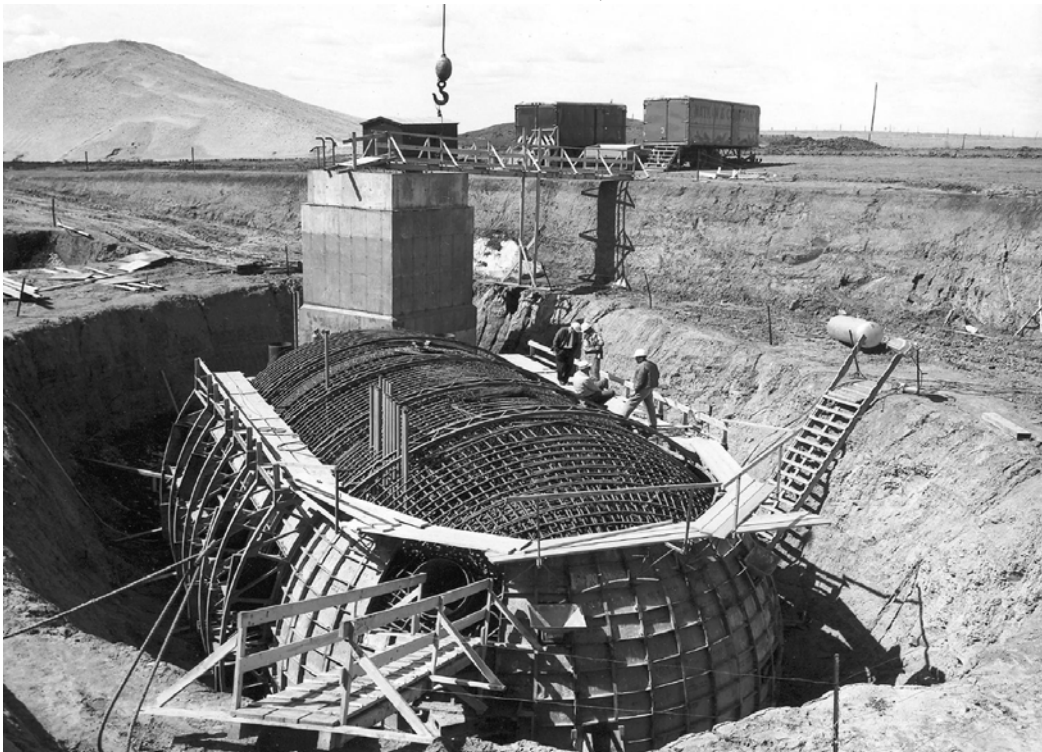


Plate 29. Launch Control Center under construction in South Dakota
(*Courtesy of Peter Kiewit and Sons', Inc.*)



Plate 30. Launch Control Center nearing completion in South Dakota
(Library of Congress, Prints and Photographs Division, Historic American Engineering
Record, Reproduction Number HAER SD-50-30)

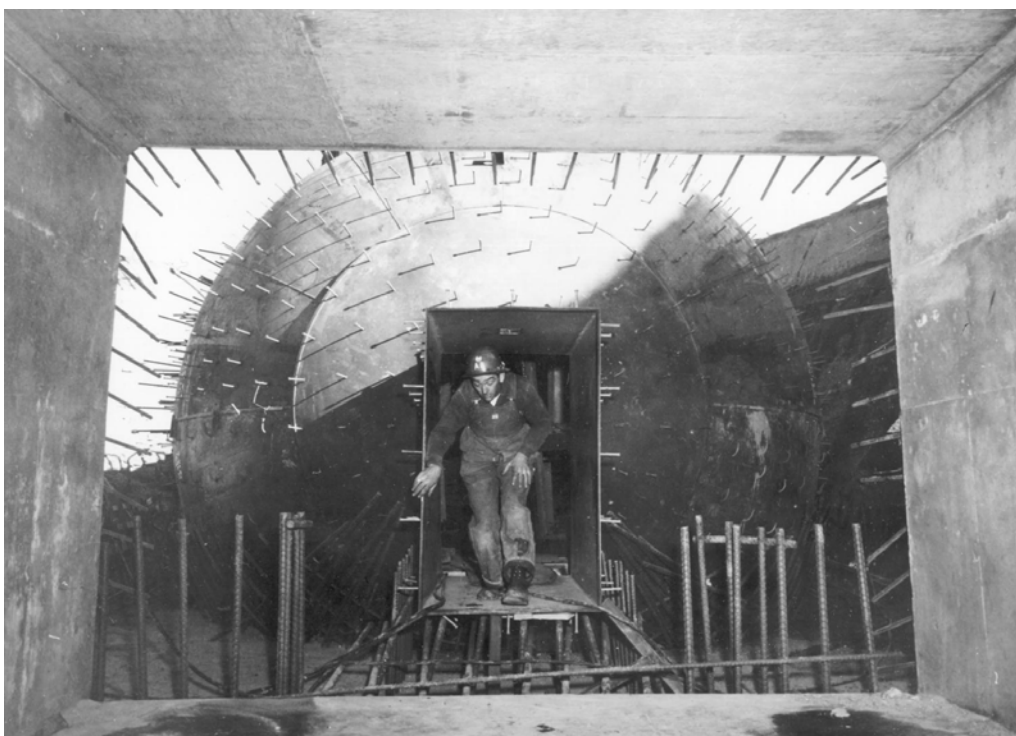


Plate 31. Interior of a Launch Control Center during construction in
South Dakota
(Courtesy of National Park Service)



Plate 32. Launch tube under construction in South Dakota (Courtesy of Peter Kiewit and Sons', Inc.)



Plate 33. Aerial view of a launch tube under construction in South Dakota (Courtesy of Peter Kiewit and Sons', Inc.)



Plate 34. Launch Facility nearing completion in South Dakota (Courtesy of Peter Kiewit and Sons', Inc.)



Plate 35. A Boeing crew assembles a first-stage Minuteman engine at the Air Force Missile Test Center, Cape Canaveral, Florida, 14 June 1963 (Photograph No. B-08-018-1, "Guided Missiles - Boeing "Minuteman," U.S. Air Force Photo, Record Group 342, National Archives, Washington,D.C.)

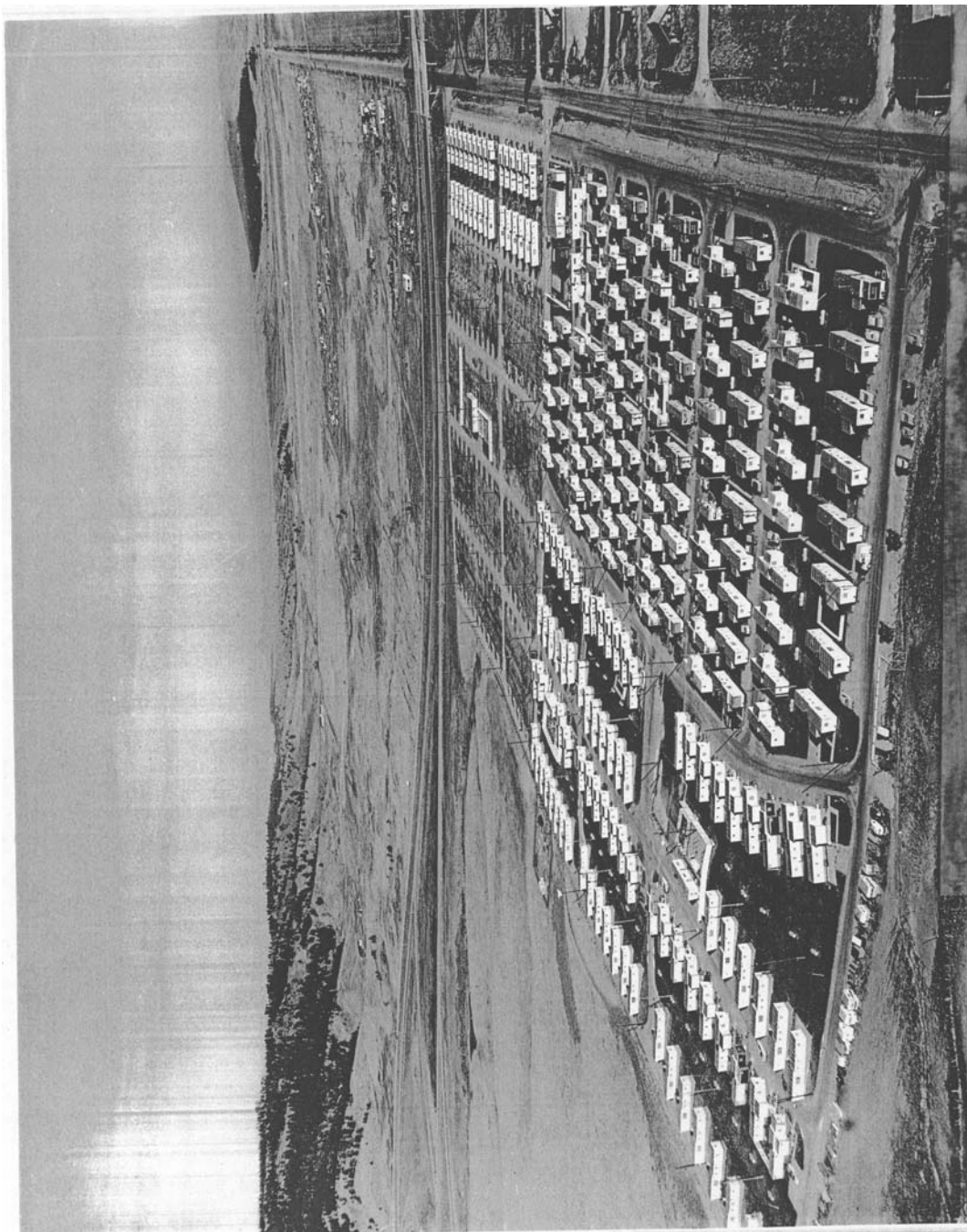


Plate 36. Northern Heights Mobile Home Park in Rapid City that may have housed Minuteman construction workers (*Boeing Archives*)

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